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THE PLANT DISEASE SURVEY

DIVISION OF MYCOLOGY AND DISEASE SURVEY

VOL. XIX April 1, 1935 Number 4

HITHERTO UNREPORTED HOSTS OF THE ROOT-KNOT NEMATODE

G. H. Godfrey

The following is a list of several hitherto unreported hosts of the root-knot nematode, Heterodera marioni (Cornu) Goodey. Most of them are of interest in that they are common weeds, and therefore are factors of considerable importance in the maintenance of nematode populations in fields. All were found in Hawaiian pineapple fields except the Tritoma, which was observed in Los Angeles County, California. Degree of infestation as commonly observed is indicated by plus signs, + meaning only a trace or light infestation, ++ medium, and +++ distinctly heavy infestation. Attention is called to the number of new host plants in the grass family, a family which has commonly been considered more or less resistant.

ASCLEPIADACEAE

GOMPHOCARPUS PHYSOCARPUS Meyer +++

CAPPARIDACEAE
CLEOME GYNANDRA L. Small spider-flower. +

CARYOPHYLLACEAE
SILENE GALLICA L. Small-flowered catch-fly. +

COMMELINACEAE
COMMELINA NUDIFLORA L. Wandering Jew. +

COMPOSITAE
ACANTHOSPERMUM XANTHOIDES D. C. +
BIDENS PILOSA L. Stick-tight. Infestation rare. +
EMILIA SONCHIFOLIA D. C. Flora's paint-brush. +++
GRAPHALIUM LUTEO-ALBUM L. +
PICRIDIUM TINGITANUM Desfontaines. +
SYNEDRELLA NODIFLORA (L.) Gaertner. ++
SENECIO HIERACIFOLIA L. Fireweed. +
TITHONIA ROTUNDIFOLIA (Miller) Blake. Tall Tithonia. ++
XANTHIUM CANADENSE Miller. Cocklebur. +

CONVOLVULACEAE
IPOMOEA PES-CAPRAE Schwartz. +
IPOMOEA TUBERCULATA Roemer. Five-fingered morning glory. +
IPOMOEA TURPETHUM Mann. +

CYPERACEAE
CYPERUS STRIGOSUS L. +

EUPHORBIACEAE
EUPHORBIA PRESSLII Guss. Upright spotted spurge. +

GRAMINEAE
AVENA FATUA L. Oat-grass. +
CAPRIOLA (CYNODON) DACTYLON (L.) Kuntze. Bermuda grass. +
CHAETOCHLOA VERTICILLATA (L.) Scrib. Prickly foxtail. +
CHLORIS GAYANA Kunth. Rhodes grass. +
PASPALUM LARRANAGAI Arech. +
PENNISETUM PURPUREUM Schum . Elephant grass. +
SYNTHERISMA CHINENSIS Hitch. Chinese crab-grass. +++
SYNTHERISMA PRURIENS Arthur. Crab-grass. +
SYNTHERISMA SANGUINALIS (L.) Dulac. Crab-grass. +
TRICHOLAENA ROSEA Nees. Natal grass. +

LABIATAE
PRUNELLA VULGARIS L. Self-heal. +
STACHYS ARVENSIS L. Stagger-weed. +

LEGUMINOSAE	
CASSIA OCCIDENTALIS L. Coffee senna.	+++
CROTALARIA SALTIANA Andrews. Rattle-pod.	+
DESMODIUM TRIFLORUM(L.)D.C. Three-flowered beggar-weed.	+
PROSOPIS JULIFLORA L. Mesquite, algaroba, kiabe.	+
LILIACEAE	
KNIPHOFIA (TRITOMA) UVARIA Hook. Torch-flower.	+++
MALVACEAE	
SIDA MEYENIANA Walp. Ilima.	+
PHYTOLACCACEAE	
PHYTOLACCA ACINOSA Roxburg.	++
PRIMULACEAE	
ANAGALLIS ARVENSIS L. Poisonous pimpernel.	+
RUBIACEAE	
PAEDERIA FOETIDA L.	++
RICHARDSONIA SCABRA St. Hilaire.	+++
SOLANACEAE	
DATURA STRAMONIUM L. Jimson weed.	+
SOLANUM NODIFLORUM Von Jacquin. Popolo.	+++
SOLANUM ACULEATISSIMUM Von Jacquin. Thorny popolo.	++
TILIACEAE	
TRIUMFETTA RHOMBOIDEA Jacquin.	+
UMBELLIFERAE	
HYDROCOTYLE ASIATICA L. Asiatic pennywort.	+
VERBENACEAE	
STACHYTARPHETA DICHOTOMA Vahl. False vervain.	+++
VERBENA BONARIENSIS L.	+

TEMPORARY VS. PERMANENT ADAPTATION OF NEMATODES TO NEW HOSTS

Investigators not infrequently report the evident transfer of certain plant parasitic nematode populations from the natural host plant species, to which they had apparently become narrowly restricted, over to other species of plants which sometimes belong to families quite unrelated to the original host. This invasion of strange hosts has usually been noted under circumstances which suggest that the original host plants had

been destroyed or eliminated, leaving other species as the only possible source of nourishment for the surviving nematodes.

Such reports, however, are likely to give the impression that the adaptation of an apparently fixed nematode population to new host species may be of frequent occurrence, may take place within a single generation, and may constitute a very serious economic menace. Yet such an impression might be entirely erroneous since the possibility remains that the establishment of a starving population of nematodes upon unnatural host plants may be only a temporary establishment which, although sometimes resulting in marked host reaction, may not, after all, be followed by the multiplication of these nematodes in the new hosts nor by their permanent survival.

In view of this possibility, and because of the importance of learning definitely the frequency of, and the length of time required for the establishment of permanent new host adaptations, it becomes particularly obligatory upon observers in such cases to extend their investigations, whenever possible, by carrying out studies which will definitely settle the question as to whether transference of the nematodes to new hosts was followed by successful survival, reproduction, and perpetuation of the nematode population on the new plant species.

H. P. Barss.

WEATHER IS REPEATING LAST WINTER'S RECORD

The weather map for the three months just ended looks much like the map for the winter of 1933-34. Both winters were colder than normal in the Northeast and warmer than normal over all the rest of the country. The soil moisture situation, for the United States as a whole, is more favorable now than it was at this time last year. Some parts of the West, however, are still exceedingly dry.

The Northeastern States were not quite so cold this winter as last and the Great Basin States were not quite so warm, according to J. B. Kincer of the Weather Bureau. Otherwise, Mr. Kincer says, the average temperatures for the two winters were practically identical. Both winters were abnormally warm in 85 percent, or more, of the country.

Since the drought of last summer, abundant rains and snows have fallen in the Mississippi Valley States, the total for the fall and winter being well above normal generally to more than one and one-half times normal in the upper valley. West of the Continental Divide precipitation for the last six months has been somewhat below normal in

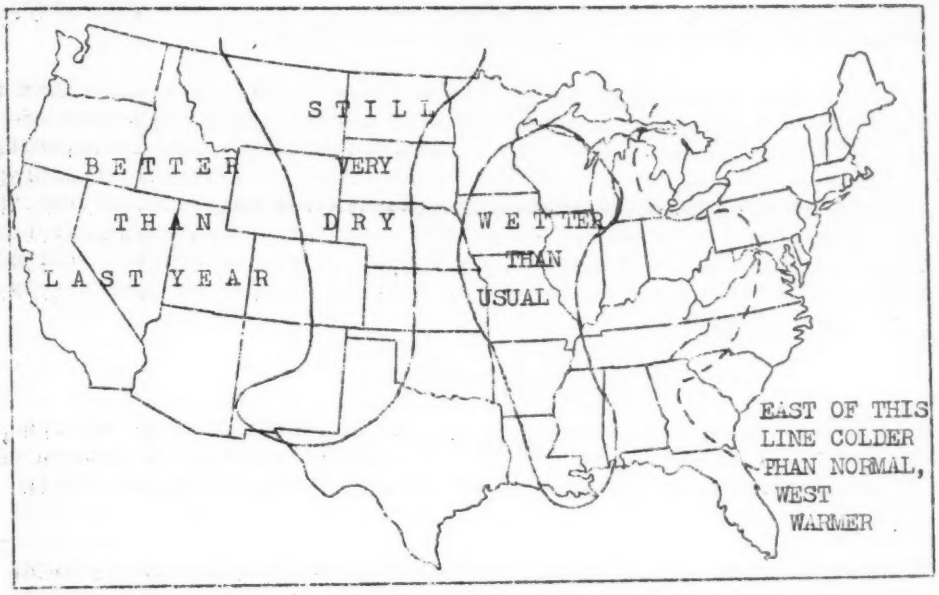

Fig. 1. Summary of weather conditions for winter, 1934-35 (Dec., Jan., Feb.)

most places, although better than last year. Stored snow in the mountains is almost uniformly more plentiful than it was a year ago. On the eastern slopes of the Rocky Mountains and in the western Great Plains area the drought not only is unrelieved, but it has been intensified by lack of normal precipitation during the last six months. In most parts of this region the supply of moisture in the ground is less than it was last year at this time. Dust storms, which were prevalent in the spring and summer of 1934, have already swept over wide areas there.

In the eastern half of the country, Mr. Kincer points out, soil moisture conditions are generally satisfactory, although more rain in the eastern part of the Ohio Valley would be helpful. (From U. S. Dept. Agr. Office of Information Press release, Mar. 4, 1935)

THE PRESENT SITUATION REGARDING EELGRASS (ZOSTERA MARINA)

Clarence Cottam, U. S. Biological Survey

(The following statement is an excerpt from Bureau of Biological Survey, Wildlife Research and Management Leaflet BS-3, Feb. 1935 (mimeographed). After discussing the history and extent of eelgrass dis-

appearance, its cause, and its effects, and past records of scarcity, the author describes present conditions as follows).

Since the first onset of the disease the condition has been most perplexing. Some areas have shown a definite progressive improvement for more than two years; others for a time produced what appeared to be a vigorous new growth, only to be laid waste shortly after; while still other sections have grown steadily worse, until the eelgrass destruction seemed complete. As a result, there have been many former extensive beds where not a single live plant could be found. Areas of slightly reduced salinity have as a rule experienced the best return, though, of course, there are many exceptions.

Present Conditions

Since November 1934, the coastal area of the United States has been carefully inspected to ascertain the condition of the eelgrass and to determine whether an improvement or a further diminution is taking place.

Conditions have been found extremely variable, with some areas decidedly worse than six and twelve months before. Considering the coast of the United States as a whole, however, there may be said to be an improvement. * * * Conditions are approaching normal in a few localized small areas where there has been a progressive improvement for the past two years.

In areas of reduced salinity, and also in the southern part of the eelgrass range (which extends to southern North Carolina), the plants are much smaller and the leaves and rhizomes narrower than those observed in more salty water or those occurring farther north.

Eastern bays and sounds.--Examples of return to normal are noted in parts of Honga River and Tarr Bay, in Chesapeake Bay. Other areas in the Chesapeake, and a few places elsewhere, show only a slightly less favorable return. Practically every point inspected in the Chesapeake north of Pungoteague Creek, near Harborton, Va., showed an improvement over conditions observed during the past two years. Not only was the growth thicker and more widely scattered, but it seemed healthier than any seen since the plants were affected in 1931 and 1932. It is well to state that in some of these areas of reduced salinity the destruction of the plants was at no time complete, nor was it so severe as in many areas nearer the coast. In the Chesapeake area and in the Swanquarter and Pamlico Sound sections of North Carolina most of the new growth has come from new shoots developing from old rhizomes. New rhizomes were produced and new plants developed. Some fruiting bodies also were produced, but the number of new plants formed from seeds was much smaller than in coastal areas north of Maryland, where much of the new growth is from seed.

Delaware, Maryland, and Virginia.--On the ocean side of the Delmarva Peninsula, in Delaware, Maryland, and Virginia, the bays are more open and the degree of salinity is almost full sea strength. In that section the eelgrass has made only slight improvement. During the summer of 1934, reports indicated some new growth, but in several hours spent on these bays during January 1935, not a single live spear of the plant was found and no drifting material was noted.

North Carolina.--On the North Carolina coast there was a decided improvement in the growth of eelgrass, although considerable disease was still evident. A good improvement was noted in this area in the summer of 1933, but the severe storms of August and September cut some 25 new inlets into Pamlico Sound, and for a time afterwards the area showed a regression from recovery. While the plants are probably not 5 percent as abundant there as before 1931, the growth has improved noticeably over conditions of a year ago. Most of it is under a foot long, but normally the plants do not attain great length in this section. Some drift was in evidence, and the limited numbers of waterfowl present seemed to be finding sufficient food. Widgeongrass (Ruppia maritima)has spread considerably there during the past 4 years and now occupies much of the space formerly covered by the Zostera. Throughout this area, as elsewhere, the best eelgrass is usually found on the borders of the shoals. It seems to do best in fairly firm rich soil in water from 2 to 5 feet deep, but the vigor of the plant is reduced if the soil is too soft, too hard, or too sandy.

New Jersey.--Throughout the summer of 1934, reports indicated a noticeable improvement in eelgrass conditions on the New Jersey coast. Specimens were submitted that appeared to be healthy, indicating an improvement over the serious condition that has existed there since 1931. In November, on further inspection, a slight improvement was noted, but it was apparent that there had been a setback or retrogression in recovery. In Barnegat Bay, where the salinity is slightly reduced, the conditions are much more favorable than in Great and Grassy Bays and other more open bays farther south.

New York.--On Long Island a continued improvement was noted. Shinnecock Bay and Mecox Bay, both brackish areas, have shown a progressive betterment, even though disease is still present. Many brant were feeding in these areas. Improvement was noted also in Great South Bay, yet conditions are far from satisfactory, while on South Oyster Bay, Moriches Bay, and Peconic Bay conditions were still bad, although reports offer some encouragement.

New England.--Conditions on the New England coast have been perplexing. A few places, including Poponesset Bay and areas near Woods Hole, were in a poorer state in 1934 than the year before, while a few other small sections have noticeably improved. The southern coast

showed a slight recovery, while most of the area north of Cape Cod showed conditions about as they were a year before. A fair stand of new growth was detected, and in some patches of fruiting plants single specimens each contained more than 100 ripening seeds. It is apparent that under favorable conditions the eelgrass would soon reestablish itself both from seeds and from running rootstalks. A number of New England areas were noted where a decided improvement had occurred during the summer, but a recurrence of the disease had made conditions as bad as before the season started.

Canada.--Reports from Canada indicate that improvement is less pronounced than on the coasts of the United States. Some encouragement is given however, as a number of areas were reported as slightly recovering. The improvement there, as farther south along the Atlantic coast, is more noticeable in estuaries, where there is decreased salinity. In many instances new growth appeared, only to be laid waste a short time later.

Europe.-- * * * On the whole the European reports indicate that conditions are still bad, probably slightly improved over those of a year ago. It is altogether too early to predict what the future of eelgrass will be along the coasts of North America and Europe. Much experimental work is needed to find suitable substitutes or resistant strains that will not be affected by the disease.

CURRENT NOTES ON PLANT DISEASES

SCLEROTINIA ROT OF CABBAGE IN SOUTH CAROLINA: Sclerotinia libertiana was observed in a three-acre field on the South Carolina Truck Experiment Station farm, Charleston. There were less than 1 percent infected plants at date of observation. This is the first time that this disease has been observed in this section in several seasons. It is not common in this area. The field in question was planted to beans in spring of 1934, followed by a cover crop of peas, planted to beans in fall of 1934, then to the present spring crop of cabbage. (W.D.Moore, Mar. 14)

EARLY REPORT ON APPLE SCAB (VENTURIA INAEQUALIS) FROM MISSOURI: During late February and in early March scab perithecia were found in abundance in many orchards in the Ozarks in the vicinity of Marionville, Aurora, Mountain Grove, and Springfield, Missouri. The first mature ascospores were found in material collected February 26, 1935. (M. A. Smith, Mar. 8)

DOWNY MILDEW ON TOBACCO (PERONOSPORA TABACINA) REAPPEARS IN GEORGIA: J. G. Gaines reported in a letter to E. E. Clayton that tobacco downy mildew was found in a plant bed not far from Tifton on March 7. Later, at the end of March, he wrote that the disease was very general but that bright clear weather had kept it in check.

VARIETAL TESTS WITH COTTON WILT IN ARKANSAS, 1934

V. H. Young

At the Cotton Branch Experiment Station, cotton wilt counts were made every ten days throughout the season on tests for varietal resistance. The percentages of cotton wilt (Fusarium vasinfectum)and yields of seed cotton for varieties tested at the Cotton Branch Experiment Station at Marianna in eastern Arkansas, and at Ozark, Arkansas, in the west central part of the state are given below.

Table 4. Percentages of wilt and yield of seed cotton for varieties tested at Cotton Branch Experiment Station at Marianna and at Ozark, Arkansas, 1934.

Name of variety	Percentage wilt		Yield-pounds seed cotton per acre	
	Marianna	Ozark	Marianna	Ozark
Coker Clevewilt	3.68	8.5	771	1004
Dixie 14-5	3.89		791	
Arkansas 17	7.38		761	
Lightning Express 8	1.90	13.2	872	642
Dixie 14-1	4.00	14.4	846	646
Delpress 3	11.56		676	
Startex	17.48	26.5	734	542
Dixie Triumph 6	9.40	15.8	936	610
Rowden 40	11.84		768	
Dixie Triumph 25	2.59	13.5	921	731
Wilson Type Big Boll	20.13		727	
Dixie Triumph 989	5.41	13.3	1061	740
Rowden 2088	6.80	16.4	881	946
Rhynes Clevewilt	1.78	9.2	904	652
Rowden 5056	3.81	38.6	737	806
Rhynes Cook	1.84	6.2	913	695
Half & Half	44.43	44.7	622	633
Acala 4067	19.94		787	
Acala 1114	19.61	29.2	706	713
Acala 120-25	25.67		752	
Hi-bred	15.93		639	
Rowden 1049	6.01		617	
Rowden 4046	2.99		657	
Rowden 456-19	16.36		766	
Rowden 566-22	13.08		602	
Missdel #1	9.19		622	
Acala 5119	19.59		677	
Acala 891	15.12		761	
Trice 304	17.21	39.8	677	602
Clevewilt 33-6		3.4		883
Dixie 14	4.5	4.5	881	881
Clevewilt 33-10		6.7		1016
Super Cleveland		30.5		570

SPREAD OF SWEET CORN BACTERIAL WILT IN ILLINOIS, 1929 TO 1934

The following could hardly be considered more than guesses yet they will probably give a mental picture of the history of bacterial wilt (Aplanobacter stewarti) in Illinois.

The disease was first discovered in 1929 at Spring Bay, which is a sandy market garden region on the Illinois River near Peoria. Perhaps 100 acres were destroyed. In 1930 the disease had spread over the entire Spring Bay, Peoria-Pekin and Springfield areas. Possibly 2000 acres were involved.

In 1931 the disease had spread through the Kankakee, Ottawa-La Salle, Rock Island, Champaign-Decatur-Bloomington, and St. Louis regions. Possibly 10,000 acres were involved.

In 1932 the disease had spread to Rockford, the Sterling-Dixon area and to that part of Cook County that lies south of Chicago. It was particularly virulent. It is probable that 20,000 acres were involved.

In 1933 the disease had spread through the northern part of Cook County and covered the entire state of Illinois. Although the disease was somewhat more widespread and equally virulent, by this time farmers had given up the growing of early varieties to some extent. Perhaps the total loss was about the same in 1933 as it was in 1932.

In 1934 the disease had largely disappeared and by this time most farmers had given up the idea of raising the earliest and most susceptible varieties. It is doubtful that the disease did one-tenth as much damage in 1934 as it had in the two previous years.

You will be interested in an experiment which I conducted in 1932. Many persons believed that corn bought in the north, especially in Minnesota would be immune from the disease. Others believed that the disease was soil-borne. I bought seed in Minnesota, had a new piece of land cleared near Peoria and planted this seed on it. The loss was about 98 per cent, one or two stalks surviving. (Lee A. Somers, March 8)